Allen and determined to be amphibole.——Klein has recently examined some crystals of *ullmannite* from Sardinia. The principal planes were those of the cube, which was striated as in pyrite, being due to the same cause, the repetition of pyritohedral edges. Pyritohedral and dodecahedral planes also occurred. The specific gravity was somewhat higher than usual, being 6.84. An analysis showed a mere trace of arsenic. The determined percentages of nickel, sulphur and antimony agree closely with the formula, Ni (Sb, S). The crystals were imbedded in calcite.—— It has been found that almost all platinum ore is magnetic, and that no purification can be effected by means of a magnet. Even a weak magnet will attract a large percentage of platinum along with the iron in an impure ore. Experiments have shown, indeed, that as much platinum as iron is attracted.——*Gold* is reported as occurring in a Cretaceous limestone in Williamson county, Texas. It is supposed to have originally existed as an auriferous pyrite, by the decomposition of which the sulphur has been removed, the iron oxidized and the gold concentrated.

BOTANY.[1]

WATSON'S CONTRIBUTIONS TO AMERICAN BOTANY, XI.—We have the pleasure of again noticing another of Mr. Watson's frequent publications, this time a thick pamphlet of one hundred pages, extracted from the Proceedings of the American Academy of Arts and Sciences (Vol. XVIII). It bears date of August 15, 1883, and contains descriptions of many new species. There is first a list of plants from Southwestern Texas and Northern Mexico, collected chiefly by Dr. E. Palmer in 1879–80, occupying nearly the whole pamphlet; this is followed by five pages devoted to descriptions of some new Western species.

The Commelinaceæ of the United States are revised in a footnote, and a synopsis of genera and species given. There is likewise a revision of the genus Bouteloua, based upon a study of the material in the Gray Herbarium. Twenty-five species are recognized, as follows: 1. *B. tenuis* Griseb., Mexico; 2. *B. prostrata* Lag., W. Texas and New Mexico to Mexico; 3. *B. simplex* Lag., South America; 4. *B. scorpioides* Lag., Mex.; 5. *B. hirsuta* Lag., Ill. to Tex., Arizona and Mex.; 6. *B. oligostachya* Torr., Saskatchewan to Tex., Ariz., S. E. Cal. and Mex.; 7. *B. polystachya* Torr., S. Utah to Tex., S. Cal. and Mex.; 8. *B. eriopoda* Torr., W. Tex. and New Mex.; 9. *B. trifida* Thurber, W. Tex., New Mex. and Mex.; 10. *B. burkei* Scribner, W. Tex. and New Mex.; 11. *B. racemosa* Lag., N. Y. and Pa. to Wis., Tex., Ariz. and Mex. [this is the *B. curtipendula* Torr., of the manuals]; 12. *B. bromoides* Lag., W. Tex. to Ariz. and Mex.; 13. *B. havardi* Vasey, W. Tex.; 14. *B. chondrosioides* Benth., Mex.; 15. *B. litigiosa* Lag., W. Indies;

[1] Edited by PROF. C. E. BESSEY, Ames, Iowa.

16. *B. elatior* Griseb., W. Indies; 17. *B. ciliata* Griseb., S. America; 18. *B. lophostachya* Griseb., S. America; 19. *B. nana* Griseb., S. America; 20. *B. pilosa* Benth., Galapagos islands; 21. *B. aristidoides* Thurber, New Mex. to S. Cal. and Mex.; 22. *B. triathera* Benth., Mex.; 23. *B. texana* Watson, Tex.; 24. *B. disticha* Benth., Peru; 25. *B. multiseta* Benth., Brazil.

A HYBRID MOSS.—H. Philibert records (*Rev. Bryol.*, x) a new instance of a hybrid moss found wild, between *Orthotrichum diaphanum* and *O. sprucei*. He considers it a true instance of a hybrid sporogonium, resulting from the fertilization of an archegonium of *O. sprucei* by antherozoids of *O. diaphanum*. The hybrid was intermediate in its characters between the two parents, and also in the time of producing its reproductive organs.—*Jour. Royal. Mic. Society for August, 1883.*

PROJECTILE FORCE IN ÆCIDIUM.—Dr. Alexander Zalewski has recently made some interesting observations on the force with which spores of the Æcidiums are discharged. He finds that in Æcidiums growing on thick coriaceous leaves or on stems and petioles, the spores are thrown vertically 10–20$^{mm.}$

The species in which he has noted this great projectile force, are the Æcidium of *Uromyces pisi* on *Euphorbia cyparissias*, the *Æcidium* of *Puccinia straminis* on *Lycopsis arvensis* and *Æcidium symphyti* on *Symphytum officinale*, while the Æcidiums on thinner leaves, as the *Æcidium* of *Puccinia calystegia* on *Calystegia sepium* and the *Æcidium* of *P. coronata* on leaves of Rhamnus discharged their spores with a force sufficient to throw them vertically only 4–6$^{mm.}$ or at most 8$^{mm.}$ He also notes that from cups of this latter species, growing on the petioles of the leaves, the spores were thrown higher than from those on the thin lamina of the leaf.—*Inaugural dissertation delivered before the Kaiser-Wilhelms-Universitat at Strassburg, 1883.*

NEW SPECIES OF NORTH AMERICAN FUNGI.—*Septoria xanthifolia* E. & K.—Epiphyllous, on light brown, rather indefinitely bordered and irregularly shaped spots, 1-4^{mm} diam., scattered over the leaf and giving it a scorched or withered look; perithecia rather numerous, slightly prominent, black, minute (70μ.); spores abundant, short, 20–30 × 1¼–1½μ., slightly curved and faintly nucleolate, yellowish. On leaves of *Iva xanthifolia.*

Septoria cacaliæ E. &. K.—Spots rusty brown, elongated or nearly circular, ¼–½^{cm} diam., with a distinct raised border and often including 1–2 smaller white spots (1–4^{mm}), which also have a distinct raised border of their own, these white spots also occur in the green portions of the leaf; perithecia amphigenous (on both the brown and white spots) or scattered over dead parts of the leaf, about 100μ. diam., black and slightly prominent; spores abundant, nearly straight, 30–35 × 1–1½μ., faintly nucleolate. On leaves of *Cacalia tuberosa.* Manhattan, Kansas, Aug., 1883.

Septoria helianthi E. & K.—Perithecia epiphyllous, immersed, brown, collapsing 150μ. diam., on brown definitely limited spots $\frac{1}{4}$–$\frac{3}{4}$^{cm} diam., with a yellowish scarcely raised border; spores linear-filiform, hyaline, nucleate, becoming 3–5 septate, 30–70 × 2–3μ., generally attenuated towards one or both ends. This is distinct from *S. helianthicola* C. & H., and from *S. paupera* Ell. On leaves of *Helianthus doronicoides*. Manhattan, Kansas, Aug., 1883.

Septoria gaurina E. & K.—Perithecia numerous, brown, immersed, 100–140μ. diam., visible on both sides of the leaf, but opening above and expelling the linear, curved, continuous or 1–3 septate, yellowish, granular 50–75 × 2$\frac{1}{2}$–3μ. spores in the form of white cirrhi. Spots light dirty brown with a rather irregular outline and a definite but only slightly raised border. On leaves of *Gaura parviflora*. Manhattan, Kansas.

Septoria mimuli E. & K —Spots white (1–2^{mm}) with a dark border; perithecia few (4–10), 80–100μ. diam., black, about equally conspicuous on both sides of the leaf; spores linear, continuous, faintly nucleolate, yellowish, often thickened at one end, 15–30 × 1–1$\frac{1}{4}$$\mu$. On leaves of *Mimulus ringens*.

Septoria sphærelloides E. & K.—Perithecia covered by the epidermis, 80–90μ. diam., perforated above, scattered evenly over the stem or collected on elongated blackened places, in which case they appear like a minute Diaporthe; spores nucleate, filiform, nearly straight, 15–22 × 1–1$\frac{1}{4}$$\mu$. On dead stems of *Hypericum corymbosum*.

Phyllosticta affinis E. & K.—Spots brown, lighter in the center, of irregular shape, elongated and angular, $\frac{1}{2}$–1^{cm} diam., with a dark raised border; perithecia yellowish, depressed, rather large, few, subcentral; spores oblong or oblong-elliptical, 4–6 × 2. On living leaves of *Sassafras officinalis*. Quite different from *P. sassafras* Cke., which has globose brown, coarsely granular spores (?) on indefinite, dark colored spots.

Phyllosticta decidua E. & K.— Spots thin, white deciduous, 1–2^{mm} diam., subangular, often confluent and irregular, margin definite but scarcely raised; perithecia small (60–100μ.), sparingly scattered over the spots and visible on both sides of the leaf; spores oblong-elliptical, 3–7 × 1$\frac{1}{2}$–3μ. (mostly 3–4 × 1$\frac{1}{2}$$\mu$.), the longer ones with 2–3 faint nuclei. On leaves of *Leonurus cardiaca*, *Nepeta cataria* and *Mentha piperita*. This appears to differ from *P. galeopsidis* Sacc, in its variable spores and deciduous spots, which give the leaf the appearance of having been eaten out by insects.

Phyllosticta asiminæ E. & K.—Spots pale brownish, of irregular shape ($\frac{1}{2}$–1^{cm}), bordered by a distinct dark raised line; perithecia subglobose, deeply immersed, their apices barely visible on the upper surface of the leaf, scattered, 100–120μ. diam.; spores yellowish with a slightly greenish tinge, obovate, 7–9 × 5–6μ. On leaves of *Asimina triloba*.

Phyllosticta lycii E. & K.— Perithecia depressed, 100μ. diam., black, visible on both sides of the leaf, on brown orbicular spots, 1–2^{mm} diam., at length whitening out and with a narrow distinctly raised border; spores elliptical or ovate-elliptical, 5–12 ×2–3μ. (mostly 5–7 × 2½μ.) subacute. The spots are concave on both sides of the leaf, more distinctly so above, and on account of the abruptly raised margin look like little round disks lying on the surface of the leaf. On leaves of *Lycium vulgare.*

Ramularia mimuli E. & K.—Spots suborbicular, ¼–½$^{cm.}$ with a dark shaded border which is more conspicuous above; hyphæ mostly hypophyllous, subfasciculate, continuous, subhyaline, 30–40 × 3μ.; conidia cylindrical, hyaline, uniseptate, 30–40 × 3μ. On leaves of *Mimulus ringens.* Closely allied to *R. phyteumatis* Sacc. & Winter.

Cercospora vernoniæ E. & K.—Epiphyllous on small (1–3^{mm}), round, gray or purplish-gray spots (which finally whiten out), with a distinct narrow raised border, which is surrounded by a purplish discoloration; hyphæ cæspitose, subfuscous, continuous, subnodulose and subdenticulate above, 25–40 × 4–5μ.; conidia slender clavate, 6–9 septate, 75–100 × 3–4. On leaves of *Vernonia fasciculata.* Manhattan, Kansas.

Cercospora sambucina E. & K.—On small suborbicular red-brown spots (2–3^{mm}), with a narrow raised border; hyphæ densely cæspitose, epiphyllous brown, flexuous, 100–150 × 3–4μ., continuous; conidia cylindric-clavate, curved, 3–7 septate, 55–75 × 3–4μ. On leaves of *Sambucus canadensis.*

Sphærella campanulæ E. & K.—Perithecia minute (¼^{mm}) scattered, covered by the epidermis, which is pierced by the papilliform ostiola; asci subcylindrical, 35–40 × 5–7μ.; sporidia crowded, uniseptate, constricted and oblong-ovate, ends subacute, 10–13 × 3–3½μ. On dead stems of *Campanula americana.*

All the species above described were collected by Professor W. A. Kellermann, and all not otherwise noted were collected in Fairfield county, Ohio, in July and Aug., 1883.

Corrections.—In the December number of this journal (1882), p. 1002, top line, for " 114 × 3," read 114μ.; same page, eighteenth line from top, for " 25–30μ.," read 35–55μ.; same page, sixteenth line from bottom, for "iolani," read Solani.—*J. B. Ellis, Newfield, N. J., and W. A. Kellerman, Manhattan, Kan.*

A Study of the Survival of the Fittest.— About three years ago a piece of ground at Kew was specially set apart to contain a collection of hardy herbaceous plants for the use of botanical teachers and their pupils. It was a perfectly level square of ground in the immediate neighborhood of the herbarium, which for a long time had been covered with grass, amongst which a few trees were planted. It was spaced out into beds with walks between them, and about 250 species were selected and a good tuft of each was planted in the beds. Each species had a

distinct plat allotted to it, the soil being quite uniform, and the species being arranged according to their systematic sequence. I have now had the collection under constant inspection for three years, and have made a catalogue of the species, classifying them in three groups, according to their power of survival under the conditions as explained. * * *

CLASS A. Species that have shown a distinct tendency to spread over the walks and take possession of the plots of ground that belong to their neighbors; fifty-nine species.

CLASS B. Species that have held their ground but do not spread; one hundred and forty-four species.

CLASS C. Species that would soon become extinct unless renewed; fifty-six species.

—*J. G. Baker, in Journal of Botany.*

[In the foregoing we have omitted the lists of names. It may be interesting to note that in Class A occur Ranunculus arvensis, Lepidium sativum, Capsella bursa-pastoris, Spergula arvensis, Lychnis githago, Œnothera biennis, Epilobium angustifolium, Fœniculum vulgare, Pastinaca sativa, Dipsacus fullonum, Chrysanthemum leucanthemum, Taraxacum officinale, Linaria vulgaris, Cynoglossum officinale, Convolvulus arvensis, Plantago major, etc., most of which are weeds. In Class B occur Ranunculus acris, Dicentra spectabilis, Linum usitatissimum, Trifolium pratense, Trifolium hybridum, Helianthus decapetalus, Solidago canadensis, Monarda fistulosa, etc., etc. In Class C we find Ranunculus bulbosus, Reseda odorata, Phlox paniculata, Cannabis sativa, Hordeum jubatum, Avena sativa, Lolium italicum, etc.—ED. BOT. NOTES.]

POPULAR BOTANY.—It is a matter of regret that the eminent men who have devoted their lives to botany in this country, have not found time to turn aside from their heavier labors now and then, for the purpose of writing books for the people—the great unbotanical majority who make up so large a part of every community. It would doubtless have taken valuable time, and no doubt some of the things now done would have been left undone, yet we are confident that it would nevertheless have been much better for the science of botany. There is a duty which every scientific man owes to the community which supports or tolerates him, a duty which becomes greater as his authority and influence are increased in his chosen field. That duty is to present in the vernacular of the people the leading facts in his science. It is impossible for all the people to become botanists, zoölogists, chemists, etc.; only a favored few are permitted to enter the temple of science, and to them the people rightly look for instruction.

In a little book before us,[1] we have a pleasant attempt by the

[1] Plant Life: Popular papers on the Phenomena of Botany. By Edward Step. New York, Henry Holt & Co.

president of the Lambeth (England) Field Club, to present in a popular way many of the more important facts in modern botany. It is not a text-book, and does not follow text-book methods. We have first a pleasant and entertaining account of microscopic plants in which Protococcus, Zygnema, Volvox, desmids, diatoms, etc., are described. With this as a basis, Chapter II presents the main facts as to plant structure and growth. Then follows an excellent chapter on the fertilization of flowers, the opening sentence of which is well worth quoting: "It is popularly held that the chief end of plants is to minister to man's sense of the beautiful in form and color, but recent investigations of scientific men should dissipate so presumptuous a theory."

Predatory plants, ferns, mosses and lichens, horsetails, fungi, etc., are taken up in various chapters, while less botanical subjects, such as the folk-lore of plants, planets and animals, plants and planets are intermingled. The chapter on the folk-lore of plants contains much that is interesting. A paragraph here may serve to show the author's method: "Who was the miscreant that altered the popular orthography of *Digitalis purpurea* from folk's-glove to foxglove? With that alteration all the poetry and the associations of fairyland were taken from the name. True, it is still the noblest of our native flowers, and one that will ever be a favorite with all; but it was the flower which supplied the fairies with gloves—delicately tinted silken coverings fit for the hands of such dainty folk—hence folk's-glove."

The little book is well work reading by even those who are versed in botany. Such will find little or nothing that is really new, but we venture to say that no one will read it without feeling repaid for the time so spent.

BOTANICAL NOTES.—In a paper read at the Minneapolis meeting of the American Association for the Advancement of Science, Dr. J. W. Dawson described two Palæozoic species of what appear to be Rhizocarps allied to Salvinia. They are named provisionally *Sporangites braziliensis* and *S. bilobata*, but "in prospect of the discovery of their vegetative parts," the name Protosalvinia is suggested for them.——In the August *Journal of Botany* Greenwood Pim describes a mould evidently related to Eurotium (Aspergillus) or Penicillium. He proposes the new genus Alliospora, and names the species *A. sapucayæ*. The specimen was found as a velvety brown-black growth on decaying Sapucaya nuts.——W. B. Grove describes, in the September number of the same journal, "A new Puccinia," which occurs on various species of cultivated violets in England. From the description given it appears to differ very little from *Puccinia violarum* as it occurs in this country. The supposed new species is named *P. ægra*.——In the same number H. F. Hance describes a new genus of Liliaceæ under the name of Disporopsis. It has affinities with the genus Polygonatum. One species (*D. fusco-picta*) from the province of Canton, China,

is described.——Dufour has described a fungus which grows on sponges, disintegrating the skeleton, and rendering it worthless. He names it *Torula spongicola.*——Most collectors have had to do with the yellow filamentous growth named Ozonium, but hitherto scarcely assignable to any place in a botanical system. Roumeguère concludes, from his recent investigations, that it is a sort of sclerotium stage of various hymenomycetous fungi belonging to the genera Coprinus, Lenzites and Craterellus.

ENTOMOLOGY.[1]

ENTOMOLOGY AT MINNEAPOLIS.[2]—*Remarks on Arzama obliquata.*—Mr. Riley also gave his experience in rearing this insect during the past two years. He exhibited specimens in all states. The eggs are laid in curious, broadly conical or plano-convex masses enveloped in hair and a mucous cream-colored secretion, which, combined, look much like spun silk inside and the glazed exudation of *Orgyia leucostigma* outside. The larva, pale at first, and more or less transparent during the earlier stages, but dark after the later stages, bores into the stems of Sagittaria and Pontederia and is semi-aquatic, the last pair of spiracles being exceptionally large and dorsal. There are two annual broods, the second hibernating as larva in moss and decaying stumps near the water. The moth shows great variation in color, and the summer generation is, on the average, not much more than half so large as the spring or hibernated generation and generally much paler. He had interesting notes on this and other semi-aquatic species, and would shortly publish a more full account of them.

Dr. Kellicott said he had bred this moth at Buffalo, N. Y., where it was very abundant, and he had found it to be single brooded. It is associated with another species, an account of which he promised to give at a future session. Adjourned.

August 15, 2 P. M., the club reconvened. Professor S. A. Forbes presented a paper entitled, "Memoranda with regard to the contagious diseases of caterpillars and the possibility of using the virus of the same for economic purposes." The following is a full abstract:

The use of contagious germs as insecticides.—Pasteur made, in 1869, discoveries showing that a contagious disease of the silkworm, one of the two to which the rapid decay of the silk industry at that time was due, and known to the French under the name of *la flacherie*, and to the Germans as *schlaffsucht*, was caused by the presence of ferment germs in the intestines of the worms, and afterward in the blood. He stated that Pasteur proved, by means of careful experiment, that this disease could be easily induced in healthy worms by sprinkling their food with

[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.

[2] Continued from p. 1070.